

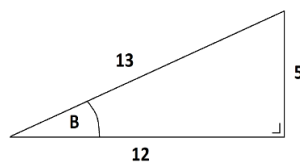
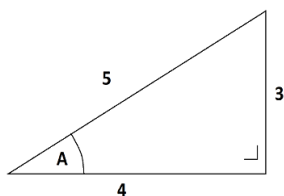


Trigonometric Formulae and Proving Identities



1. Prove: $\sin x \sec x = \tan x$
2. Prove: $\frac{\tan x \cos x}{\sin x} = 1$
3. Prove: $\frac{\sec x \csc x}{\csc^2 x} = \tan x$
4. Prove: $\frac{\sin x + \cos x}{\cos x} = \tan x + 1$
5. Prove: $\cos(A + B) \cos B + \sin(A + B) \sin B = \cos A$
6. Prove: $\tan(A + B) = \frac{\tan A + \tan B}{1 - \tan A \tan B}$
7. Prove: $\cos 3\theta = 4 \cos^3 \theta - 3 \cos \theta$
8. Prove: $\sin 3\theta = 3 \sin \theta - 4 \sin^3 \theta$
9. Prove: $1 - \cos^2 x \tan^2 x = \cos^2 x$
10. Prove: $\sec^2 x = 1 + \tan^2 x$
11. Prove: $\frac{\tan x}{1 + \tan x} = \frac{\sin x}{\cos x + \sin x}$
12. Prove: $(\sin x + \cos x)^2 + (\sin x - \cos x)^2 = 2$

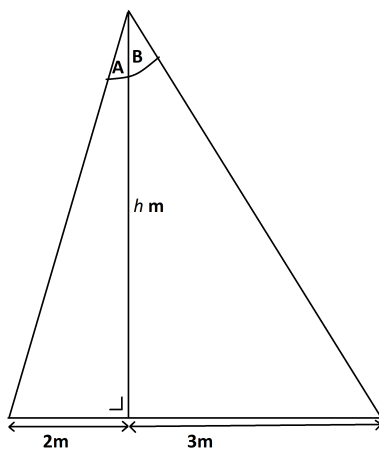




13. Use the triangles shown above to find the value of

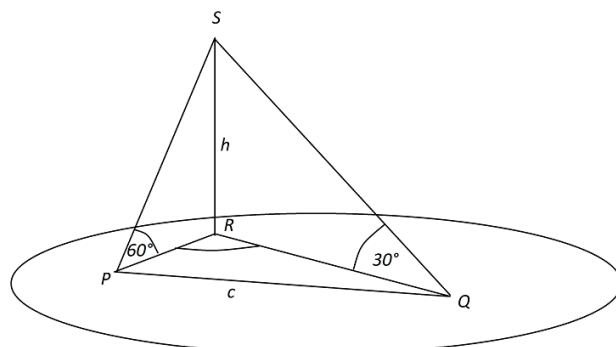
- (a) $\sin(A + B)$
- (b) $\cos(A - B)$

14. The diagram shows a triangle of height h m. The angles A and B are such that $A + B = 45^\circ$. By using the expansion of $\tan(A + B)$, or otherwise, find the value of h





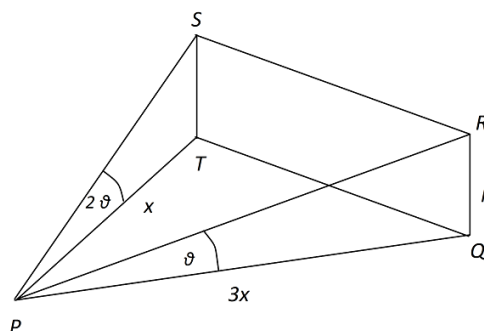
15. P, Q and R are three points on the horizontal ground. $[SR]$ is a vertical pole of height h metres.



The angle of elevation of S from P is 60° , and the angle of elevation of S from Q is 30° .

Given that $3c^2 = 13h^2$, find $|\angle PRQ|$.

16. $QRST$ is a vertical rectangular wall of height h on level ground. P is a point on the ground in front of the wall.



The angle of elevation of R from P is θ , and the angle of elevation of S from P is 2θ .
 $|PQ| = 3|PT|$.

Find the measure of θ .

